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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] With respect to an accident emergency reporting system, after transmission of the emergency intelligence by data communication, especially this invention performs voice communication by automatic change, or it constitutes it so that data / voice broadcast may be made possible.

[0002]

[Description of the Prior Art] Even when the communication link with the exterior by the operator becomes impossible in the accident of cars, such as an automobile, etc. conventionally, the emergency reporting system which can transmit an abnormal occurrence outside with the location of a car is indicated by JP,9-198592,A. According to it, measure a self-location for every predetermined time using the navigation system which measures a self-location based on the positional information from GPS, and the measurement value and measurement time of day are memorized for a storage means. When the abnormalities of a car are detected by the malfunction detection means, it constitutes so that the abnormal occurrence message created based on the newest measurement value and the measurement time of day which were memorized for the storage means may be sent out to the receiving set which was able to be defined beforehand via a wireless dial-up line.

[0003] This system had a problem of the ability not to make the detailed contents of accident know correctly only by carrying out data communication of the newest abnormal occurrence message created based on the time-of-day data which memorized self-location data and a self-location to a predetermined report place.

[0004]

[Problem(s) to be Solved by the Invention] so, when the purpose of this invention cancels the above-mentioned trouble and emergency occurs on a car in accident etc. First The positional information of a self-vehicle, accident information, the car ID made to have memorized further beforehand Perform data communication according emergency intelligence, such as crew ID information, to wireless in the emergency relief center, and change to voice communication automatically at the time of the data communication termination, or data / voice broadcast means is used. It is in offering the accident emergency reporting system which can make an emergency

relief center know the detailed contents of accident.

[0005]

[Means for Solving the Problem] An accident detection means by which the accident emergency reporting system by this invention detects the accident of a self-vehicle by sensors, such as gravitational acceleration and an inclination of a self-vehicle, A self-vehicle location specification means to pinpoint the location of a self-vehicle from the sense information of GPS, a gyroscope, a speed sensor, etc., etc., The radio means for communicating on radio in the emergency relief center which carries out the postscript of the emergency intelligence, such as positional information of the above mentioned self-vehicle, accident information, the car ID made to have memorized further beforehand, and crew ID information Or the car which has at least data, and the data / voice simultaneous transmission means which voice can be transmitted to coincidence, It is the accident emergency reporting system which changes from the emergency relief center which performs the mobilization request of an urgent automobile to the location on which said car is put based on the contents in response to said emergency intelligence. 1st radio-transmission means by which said radio means transmits emergency intelligence to said emergency relief center in data communication from said car at the time of the occurrence of accident, It is characterized by having at least the 2nd radio-transmission means which makes voice communication possible in said emergency relief center from said car by automatic change at the time of the data communication termination by said 1st radio-transmission means.

[0006] Furthermore, it is characterized by enabling it to perform the above-mentioned data communication and the above-mentioned voice communication in concurrency by having data / voice simultaneous transmission means.

[0007] Since the emergency intelligence by data communication is transmitted to an emergency relief center also in the worst condition while being able to make the detailed contents of accident know correctly, since emergency intelligence is first transmitted in the data communication by wireless and automatic switching, or data / voice broadcast is performed subsequently to voice communication by having such a configuration, the organization of quicker and exact rescue and exchange can be constructed.

[0008]

[Embodiment of the Invention] An accident detection means by which invention of this invention according to claim 1 detects the accident of a self-vehicle by sensors, such as gravitational acceleration and an inclination of a self-vehicle, A self-vehicle location specification means to pinpoint the location of a self-vehicle from the sense information of GPS, a gyroscope, a speed sensor, etc., etc., The radio means for communicating on radio in the emergency relief center which carries out the postscript of the emergency intelligence, such as positional information of the above mentioned self-vehicle, accident information, the car ID made to have memorized further beforehand, and crew ID information Or the car which has at least data, and the data / voice simultaneous transmission means which voice can be transmitted to coincidence, It is the accident emergency reporting system which changes from the emergency relief center which performs the mobilization request of an urgent automobile to the location on which said car is put based on the contents in response to said emergency intelligence. 1st radio-transmission means by which said radio means transmits emergency intelligence to said emergency relief center in data communication from said car at the time of the occurrence of accident, It considers as the accident emergency reporting system characterized by having at least the 2nd radio-transmission means which makes voice communication possible in said emergency relief center

from said car by automatic change at the time of the data communication termination by said 1st radio-transmission means. While being able to make the detailed contents of accident known correctly, it has an operation that the emergency intelligence by data communication can transmit to an emergency relief center also in the worst condition.

[0009] Moreover, it has an operation that cutting control of a circuit can be performed by emergency relief center initiative so that it may make for invention according to claim 2 to perform cutting control of a circuit by said emergency relief center initiative during data communication and voice communication into the accident emergency reporting system according to claim 1 by which it is characterized and cutting control from an emergency call unit side may not be performed for the connected circuit.

[0010] Moreover, invention according to claim 3 will interrupt the voice communication by said 2nd radio-transmission means, if the high data communication demand of a new priority occurs during the voice communication by said 2nd radio-transmission means. It considers as the accident emergency reporting system according to claim 1 characterized by constituting so that data communication by said 1st radio-transmission means may be made possible. Also after changing to voice communication, it has an operation that a re-change can be carried out to data communication to the newly invited situation.

[0011] Moreover, as said data / voice broadcast means, invention according to claim 4 considers as the accident emergency reporting system according to claim 1 characterized by constituting by Frequency Division Multiplexing, Time Division Multiplexing, or space division multiplex (spread spectrum method) so that voice communication may also be transmitted simultaneously during data communication, and has an operation that voice communication can be quickly started of an operator's volition on the occasion of the change to voice communication from data communication.

[0012] Hereafter, the gestalt of operation of this invention is explained based on a drawing.

[0013] **Drawing 1** is the block diagram showing the outline configuration of the accident emergency reporting system concerning the gestalt of each operation of this invention. In **drawing 1**, the accident emergency reporting system is constituted so that the car 1 carrying the emergency call unit which acquires the positional information of a self-vehicle from GPS at least, and was recorded can notify the urgent emergency center 2 through a network (a base station, switched network) at the time of the occurrence of accident. The urgent emergency center 2 grasps the situation of accident based on the report from a car 1, requests mobilization of an urgent car from a site from arrangements of a hospital, a nearby police station, and a fire department, and requests corrective action. Moreover, it is made to perform data communication of the safety check of a car 2 by data communication, since he is trying for the urgent emergency center 2 to offer emergency relief service by the owner and contract of a car automatically at least about a car 2.

[0014] **Drawing 2** shows the outline of the configuration of a car in which the emergency call unit was carried. An accident detection means 21 by which sensors, such as gravitational acceleration and an inclination of a self-vehicle, detect the accident of a self-vehicle in **drawing 2**, A self-vehicle location specification means 22 to pinpoint the location of a self-vehicle from the sense information of GPS, a gyroscope, a speed sensor, etc., etc., The positional information of the above mentioned self-vehicle, accident information, the car ID made to have memorized further beforehand It has the radio means 23 for communicating emergency intelligence, such as crew ID information, on radio in the emergency relief center or the data / voice broadcast means

27, the storage means 24 containing ROM or RAM, CPU25, and the power source 26.

[0015] (Gestalt of the 1st operation) In the configuration of the car carrying the above accident emergency reporting systems and emergency call units, the gestalt of operation of the 1st of this invention is explained. As shown in drawing 3, the radio means is equipped with the antenna 31 and the usual cellular-phone unit (a transmitter/receiver part, body section of a cellular phone concerning the transmission and reception except the antenna section) 32, and is further equipped with the 1st radio-transmission means 33 to which a modem 34 is connected through a circuit changing switch (a postscript is carried out) as the cellular-phone unit 32, and the 2nd radio-transmission means 35 connected to a hand set (or hand free) 36 through a circuit changing switch (a postscript is carried out). In addition, in drawing 3, it is shown that a dotted line is controlled by CPU in an emergency call unit.

[0016] Drawing 4 shows the configuration of the radio means described above in the configuration list of the emergency call unit concerning the gestalt of operation of the 1st of this invention more to a detail. In drawing 4, although the part and modem part of a changeover switch of a radio means are contained in the emergency call unit, others are prepared out of the emergency call unit. And CPU41, a flash ROM 42, RAM43, the gyroscope sensor 44, the GPS receiver 45, the rollover sensor 46, the current supply section 47, the modem 48, the changeover switch 49, and the echo canceller 50 are formed in the emergency call unit. Moreover, the ON/OFF information on a key switch, the information on a crash sensor, the information on a rate sensor, etc. are inputted into CPU41.

[0017] Drawing 5 shows the outline configuration of the emergency relief center concerning the gestalt of operation of this invention, the emergency relief center is equipped with means of communications 51, the communications control means 52, the database 53, and display/message means 54, and the exchange of a database 53 and display/message means 54, and data is made to be made by the communications control means 52 in it through LAN. Means of communications 51 is connected and connection controlled through a link at the communications control means 52 including the exchange. The database 53 stores and holds the customer management data about the owner of a car etc., map data, the data about an urgent call, etc.

[0018] Means of communications (exchange) 51 is connected with a car via a public wire circuit, a public wireless circuit, etc. which a common carrier offers, and reception of the emergency intelligence from a car is attained. A communications control means 52 decodes the emergency intelligence at the time of reception of the emergency intelligence from a car, takes out time-of-day data / location data, accident information, the car ID that makes have memorized further beforehand, crew ID information, etc., performs map matching with the map data which picked out from the database 53, and displays it on a display/message means 54 while it notifies the occurrence of accident to a display/message means 54 to by which an operator is at his desk. An operator can see the contents of the displayed accident and can construct quick emergency exchange organization, such as a mobilization request of an urgent automobile, and arrangements of an emergency hospital.

[0019] Next, actuation of the accident emergency reporting system of the gestalt of operation of the 1st of this invention is explained.

[0020] The self-vehicle location specification means 22 of drawing 2 acquires time information at the same time it acquires positional information from GPS periodically in the GPS receiver 45 so that it may be illustrated by drawing 4, and it memorizes it to the flash ROM 42 in an emergency call unit. When the rollover sensor 46 senses the inclination beyond actuation of the

crash sensor by gravitational acceleration joining a car 1, or the need for a car 1, the accident detection means 21 of **drawing 2** detects the occurrence of accident, and it memorizes it to a flash ROM 42 while it notifies the occurrence of accident to CPU41 of an emergency call unit. [0021] CPU41 of the emergency call unit which received the notice of the occurrence of accident The information which the 1st radio-transmission means 33 of **drawing 3** was operated, and was memorized about accident to the flash ROM 42, i.e., positional information of a car 1, time information and the sense information showing the contents of accident from various sensors -- it memorizes to a flash ROM 42 further beforehand -- having -- Car ID -- While making it a predetermined transmission format at the same time it reads crew ID information etc., change a circuit changing switch 49 to a modem side, and a cellular-phone unit and a modem 48 are connected. It transmits in a data communication format towards the emergency relief center 2 via a public line through Antenna TEL as emergency intelligence.

[0022] Detection of termination of the data transmission of the emergency intelligence of a data communication format of the communications control means 52 of the emergency relief center 2 returns ACK which shows that data were received to the car 1. Thereby, CPU41 of the emergency call unit of a car 1 connects a cellular-phone unit, a hand set, or hand free, and starts voice communication while it operates the 2nd radio-transmission means 35 of **drawing 3** and changes a changeover switch 49 to a hand set or hand free automatically.

[0023] It enables it to talk over the telephone by this among the operators who are present at display/message means 54 of the emergency relief center 2 with the crew in a car in a voice communication format.

[0024] If the communication link sequence about the above is illustrated, it can express like **drawing 6** .

[0025] If the condition that data communication should be carried out according to generating of the high situation of a priority new the midst of the voice communication by the voice communication format is detected, CPU41 of an emergency call unit can operate the 1st radio-transmission means 33 again, and can also transmit emergency intelligence again in a data communication format.

[0026] In the emergency relief center 2, a communications control means 52 to control the exchange through the 51 casks of means-of-communications exchange receives the emergency intelligence transmitted in the data communication format. The communications control means 52 is controlled to be able to perform cutting control of a circuit by communications control means 52 initiative while decoding the emergency intelligence first transmitted in the data communication format and specifying the contents of accident. It displays on display/message means 54, decoding the current position of the car which accident generated, time of day, the actuation situation of an accident sensor, Car ID, Crew ID, etc., and carrying out map matching of it on the map data from a database 53 after that.

[0027] Subsequently, the communications control means 52 detects termination of a data communication format, and ACK is returned to emergency relief center side empty vehicle both sides. CPU41 by the side of a car detects this ACK, in a car side, the 2nd radio-transmission means 35 is operated and an automatic change is carried out to voice communication. Moreover, in an emergency relief center side, means of communications 51 changes to an extension, and carries out the message by the voice communication format with the crew of a car by operator telephone. Since it comes to be able to perform a voice message automatically among the crews of a car, an accident situation can be complemented, and a more exact accident situation can be

grasped.

[0028] The emergency relief central site operator who has grasped the accident situation as mentioned above looks at the contents displayed on display/message means 54, and he performs generating prevention of secondary disaster, arrangements of a hospital, etc. while he performs the mobilization request of urgent automobiles, such as a police car and an ambulance, in the location on which the car is put through means of communications 51.

[0029] (Gestalt of the 2nd operation) The gestalt of operation of the 2nd of this invention is hereafter explained based on a drawing. Since the configuration of the car and emergency relief center carrying an accident emergency reporting system and an emergency call unit is already explained, it does not re-explain here. In addition, explanation is omitted about the same configuration as the gestalt of the 1st operation.

[0030] As shown in drawing 7, it has the antenna 31 and the usual cellular-phone unit (a transmitter/receiver part, body section of a cellular phone concerning the transmission and reception except the antenna section) 32, and the cellular-phone unit 32 is further connected to a speed conversion and the command-processing section 38 through data / voice simultaneous transmission means 37, and data / voice broadcast means can be connected with a hand set (or hand free) 36 through data / voice simultaneous transmission means 37.

[0031] Although there is various the technique of realizing data / voice broadcast, some examples are explained briefly. There is frequency-division multiplex as the 1st technique. This method is further divided into (a) DTMF method and (b) FSK method. And (a) DTMF method superimposes data transmission with a low speed by DTMF (Dual Tone Multi-Frequency) in the usual voice transmission mode. On the other hand, (b) FSK method superimposes the data transmission of a low speed by FSK (Frequency Shift Keying) in the usual voice transmission mode.

[0032] Next, there is time-division multiplexing as the 2nd technique. This method is realized by using it with data and voice, dividing into 4800 bitsets at a time the circuit which can transmit the data of 9600bit(s) as a data transmission rate. In this case, of course, CODEC of a low bit rate of 4.8 kb/s extent (coding/decryption machine) is needed for voice transmission. moreover, a voice message -- general -- about -- since only 1/3 is occupied -- about [ remaining ] -- since silent time amount is not fixed, rate adaptation processing of a flow control etc. is needed, therefore it is necessary to be able to carry out data transmission also to the time amount, since there is silent time amount two thirds, but to prepare a silent detecting element in a voice part, or to prepare rate adaptation and the command-processing section in the data transmission section

[0033] Furthermore as the 3rd technique, there is a space division multiplex (spread spectrum method) method. this method -- usually -- coming out -- since it is a cellular-phone method as a CDMA method, it has already realized and a transmission band can improve by leaps and bounds, data/not only voice but image data can be transmitted -- it becomes like.

[0034] In addition, the above-mentioned "command processing" is processing for generally controlling the mode of operation of MODEM(s), such as transmission speed, such as an AT command carried in MODEM, an error detection correction method, and a method of a flow control, by the command, and this processing itself is known well.

[0035] Drawing 8 shows the configuration of the data / voice broadcast means described above in the configuration list of the emergency call unit concerning the gestalt of operation of the 2nd of this invention more to a detail. In drawing 8, although data / voice simultaneous transmission means, a changeover switch, and a speed conversion and the command-processing section are



contained in the emergency call unit, others are prepared out of the emergency call unit. And CPU41, a flash ROM 42, RAM43, the gyroscope sensor 44, the GPS receiver 45, the rollover sensor 46, the current supply section 47, an echo canceller 50, the data / voice simultaneous transmission means 55, and a speed conversion and the command-processing section 56 are formed in the emergency call unit. Moreover, the ON/OFF information on a key switch, the information on a crash sensor, the information on a rate sensor, etc. are inputted into CPU41.

[0036] Next, actuation of the accident emergency reporting system of the gestalt of operation of the 2nd of this invention is explained.

[0037] The self-vehicle location specification means 22 of drawing 2 acquires time information at the same time it acquires positional information from GPS periodically in the GPS receiver 45 so that it may be illustrated by drawing 8, and it memorizes it to the flash ROM 42 in an emergency call unit. When the rollover sensor 46 senses the inclination beyond actuation of the crash sensor by gravitational acceleration joining a car 1, or the need for a car 1, the accident detection means 21 of drawing 2 detects the occurrence of accident, and it memorizes it to a flash ROM 42 while it notifies the occurrence of accident to CPU41 of an emergency call unit.

[0038] CPU41 of the emergency call unit which received the notice of the occurrence of accident The information which the speed conversion and the command-processing section 38 of drawing 7 were operated, and was memorized about accident to the flash ROM 42, i.e., positional information of a car 1, time information and the sense information showing the contents of accident from various sensors -- it memorizes to a flash ROM 42 further beforehand -- having -- Car ID -- A cellular-phone unit, and a speed conversion and the command-processing section 38 are connected at the same time it reads crew ID information etc., and it transmits in a data communication format towards the emergency relief center 2 via a public line through Antenna TEL as emergency intelligence.

[0039] Detection of termination of the data transmission of the emergency intelligence of a data communication format of the communications control means 52 of the emergency relief center 2 returns ACK which shows that data were received to the car 1. Thereby, CPU41 of the emergency call unit of a car 1 connects a cellular-phone unit, a hand set, or hand free, and starts voice communication while changing it to the hand set or hand free of drawing 7 automatically.

[0040] It enables it to talk over the telephone by this among the operators who are present at display/message means 54 of the emergency relief center 2 with the crew in a car in a voice communication format.

[0041] If the communication link sequence about the above is illustrated, it can express like already explained drawing 6.

[0042] If the condition that data communication should be carried out according to generating of the high situation of a priority new the midst of the voice communication by the voice communication format is detected, CPU41 of an emergency call unit can operate a speed conversion and the command-processing section 38, and can also transmit emergency intelligence again in a data communication format.

[0043] In the emergency relief center 2, a communications control means 52 to control the exchange through the 51 casks of means-of-communications exchange receives the emergency intelligence transmitted in the data communication format. The communications control means 52 is controlled to be able to perform cutting control of a circuit by communications control means 52 initiative while decoding the emergency intelligence first transmitted in the data communication format and specifying the contents of accident. It displays on display/message

means 54, decoding the current position of the car which accident generated, time of day, the actuation situation of an accident sensor, Car ID, Crew ID, etc., and carrying out map matching of it on the map data from a database 53 after that.

[0044] Subsequently, the communications control means 52 detects termination of a data communication format, and ACK is returned to emergency relief center side empty vehicle both sides. CPU41 by the side of a car detects this ACK, in a car side, the 2nd radio-transmission means 35 is operated and an automatic change is carried out to voice communication. Moreover, in an emergency relief center side, means of communications 51 changes to an extension, and carries out the message by the voice communication format with the crew of a car by operator telephone. Since it comes to be able to perform a voice message automatically among the crews of a car, an accident situation can be complemented, and a more exact accident situation can be grasped.

[0045] The emergency relief central site operator who has grasped the accident situation as mentioned above looks at the contents displayed on display/message means 54, and he performs generating prevention of secondary disaster, arrangements of a hospital, etc. while he performs the mobilization request of urgent automobiles, such as a police car and an ambulance, in the location on which the car is put through means of communications 51.

[0046] In addition, although the gestalt of the above-mentioned 1st and the 2nd operation explained what the radio means 23 for communicating on radio in the emergency relief center, and the data / voice broadcast means 27 equip with emergency intelligence, such as the car ID which was shown in drawing 2, and which is made to have memorized beforehand, and crew ID information, alternatively Coincidence is equipped with the two above-mentioned means of communications, and you may enable it to choose the either freely by the mode change.

[0047]

[Effect of the Invention] While being able to make the detailed contents of accident know correctly as explained above according to the accident emergency reporting system of this invention, it is effective in the ability of the emergency intelligence by data communication to transmit to an emergency relief center also in the worst condition.

[0048] Moreover, according to the accident emergency reporting system of this invention, also after changing to voice communication, it is effective in the ability to carry out a re-change to data communication to the newly invited situation.

[0049] Moreover, according to the accident emergency reporting system of this invention, since data communication and voice communication can be carried out to coincidence, it is effective in the ability to respond quickly in voice communication to the newly invited situation.

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[Translation done.]



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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

**[Drawing 1]** The block diagram showing the outline configuration of the accident emergency reporting system of the gestalt of each operation of this invention,

**[Drawing 2]** The block diagram showing the outline of the configuration of a car in which the emergency call unit concerning the gestalt of each operation of this invention was carried,

**[Drawing 3]** The block diagram showing the configuration of the radio means concerning the gestalt of operation of the 1st of this invention,

**[Drawing 4]** The configuration block Fig. having shown the configuration of a radio means in the detail more at the configuration list of the emergency call unit concerning the gestalt of operation of the 1st of this invention,

**[Drawing 5]** The block diagram showing the outline configuration of the emergency relief center concerning the gestalt of each operation of this invention,

**[Drawing 6]** Drawing showing the communication link sequence between the emergency call units and emergency relief centers concerning the gestalt of each operation of this invention,

**[Drawing 7]** The block diagram showing the configuration of the data / voice broadcast means concerning the gestalt of operation of the 2nd of this invention,

**[Drawing 8]** It is the configuration block Fig. having shown the configuration of data / voice broadcast means in the detail more at the configuration list of the emergency call unit concerning the gestalt of operation of the 2nd of this invention.

[Description of Notations]

1 Car Carrying Emergency Call Unit

2 Emergency Relief Center

21 Accident Detection Means

22 Self-Vehicle Location Specification Means

23 Radio Means

24 Storage Means

25 41 CPU

26 Power Source

27 Data / Voice Broadcast Means

31 ANT

32 Cellular-Phone Unit  
33 1st Radio-Transmission Means  
34 48 Modem  
35 2nd Radio-Transmission Means  
36 Hand Set/Handsfree  
37 55 Data / voice simultaneous transmission means  
38 56 A speed conversion and the command-processing section  
42 Flash ROM  
43 RAM  
44 Gyroscope Sensor  
45 GPS Receiver  
46 Rollover Sensor  
47 Current Supply Section  
49 Changeover Switch  
50 Echo Cancellor  
51 Means of Communications  
52 Communications Control Means  
53 Database  
54 Display/Message Means

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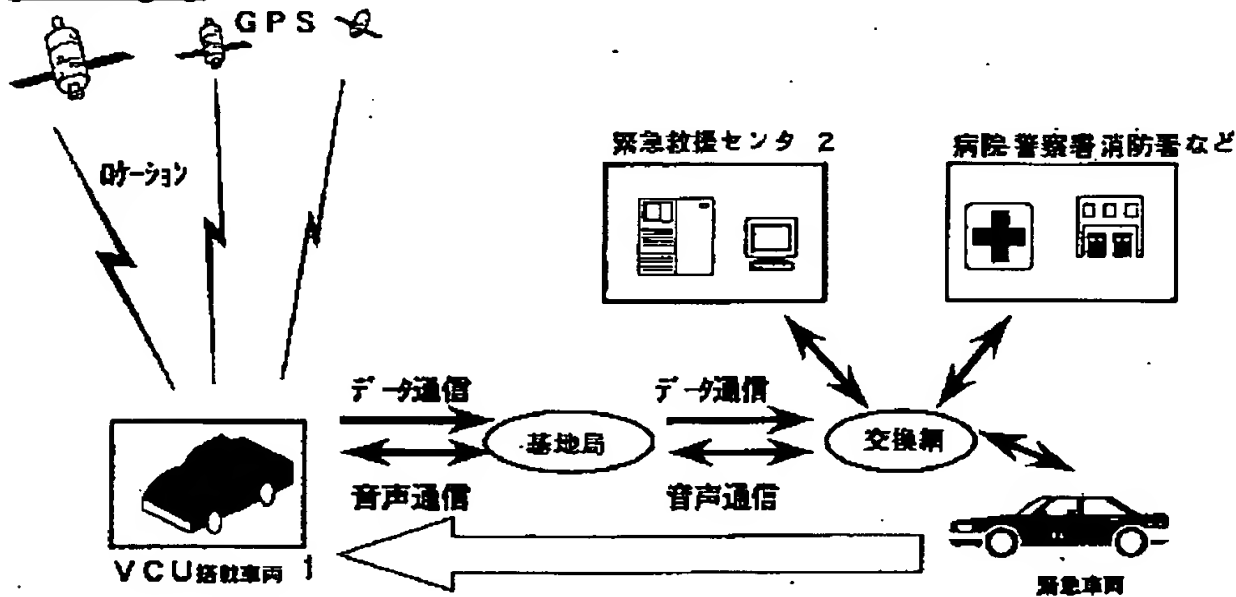
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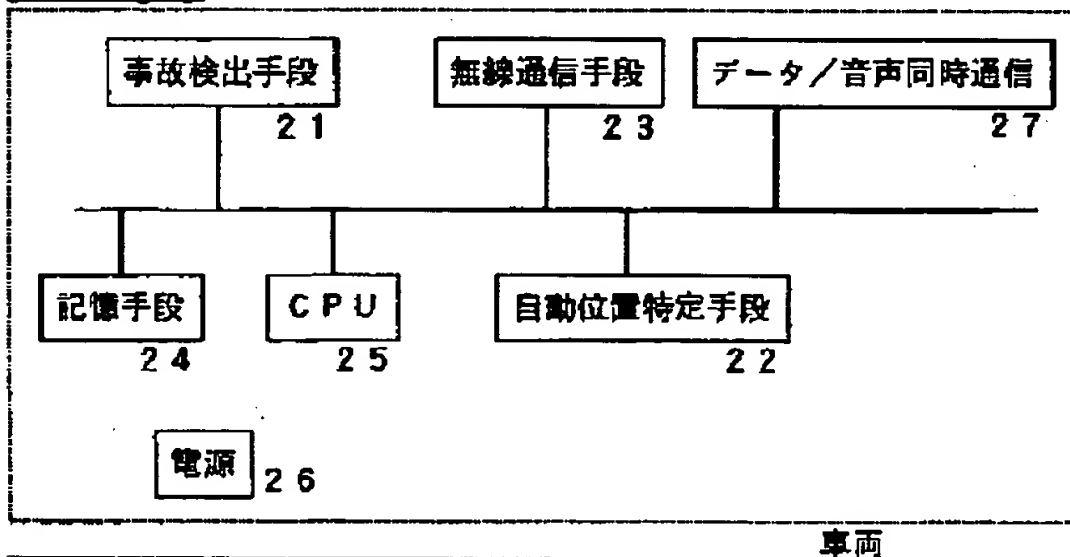
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DRAWINGS

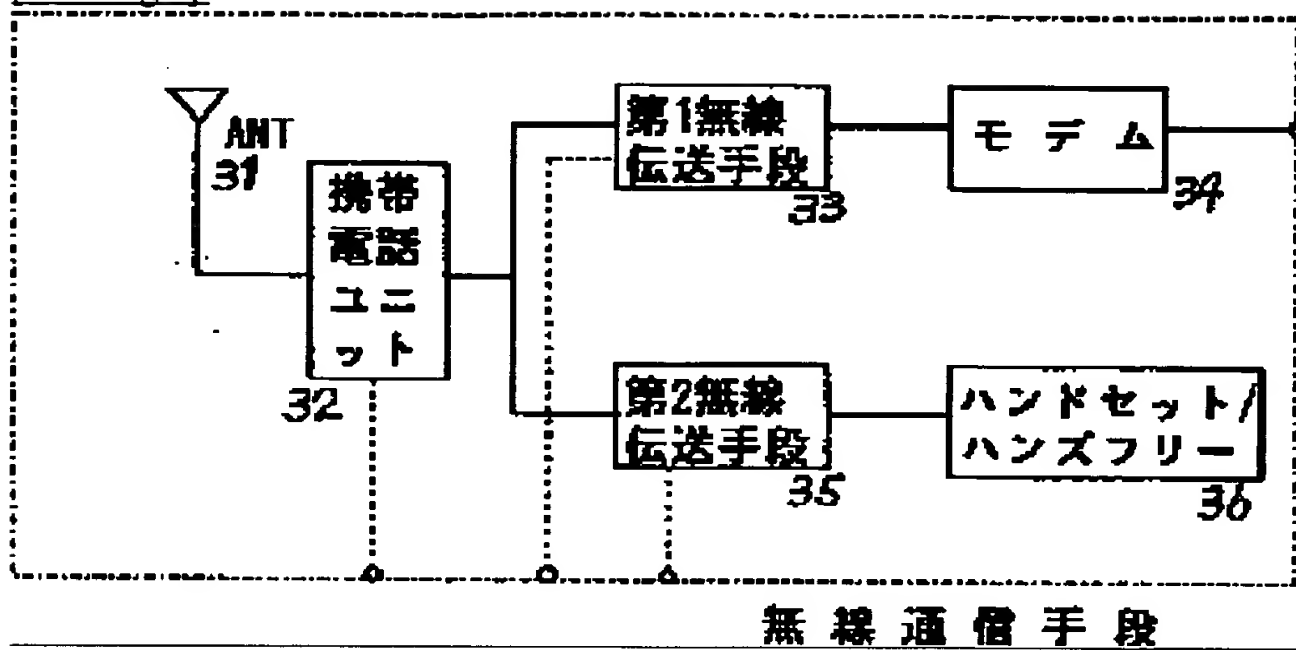
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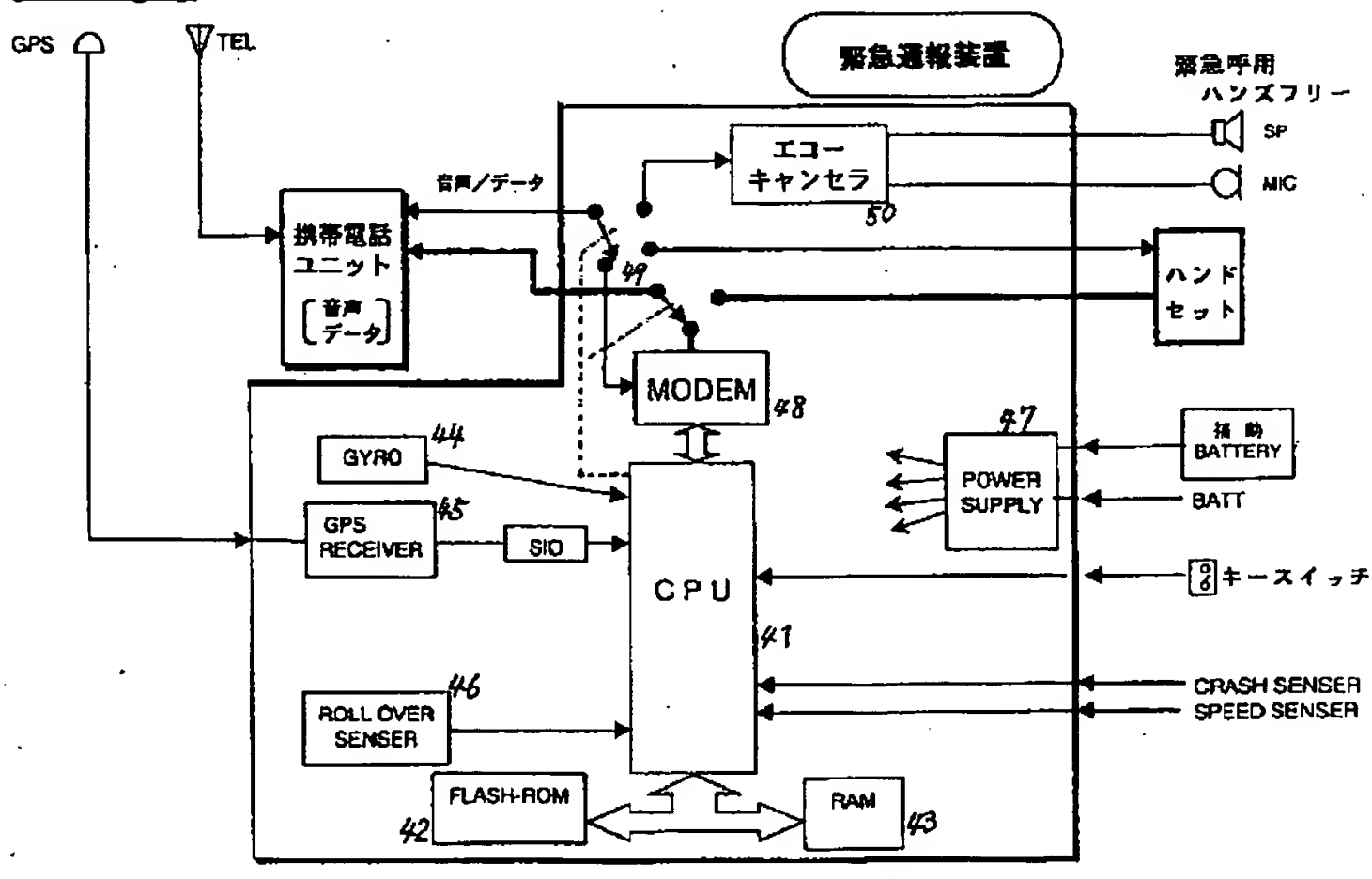
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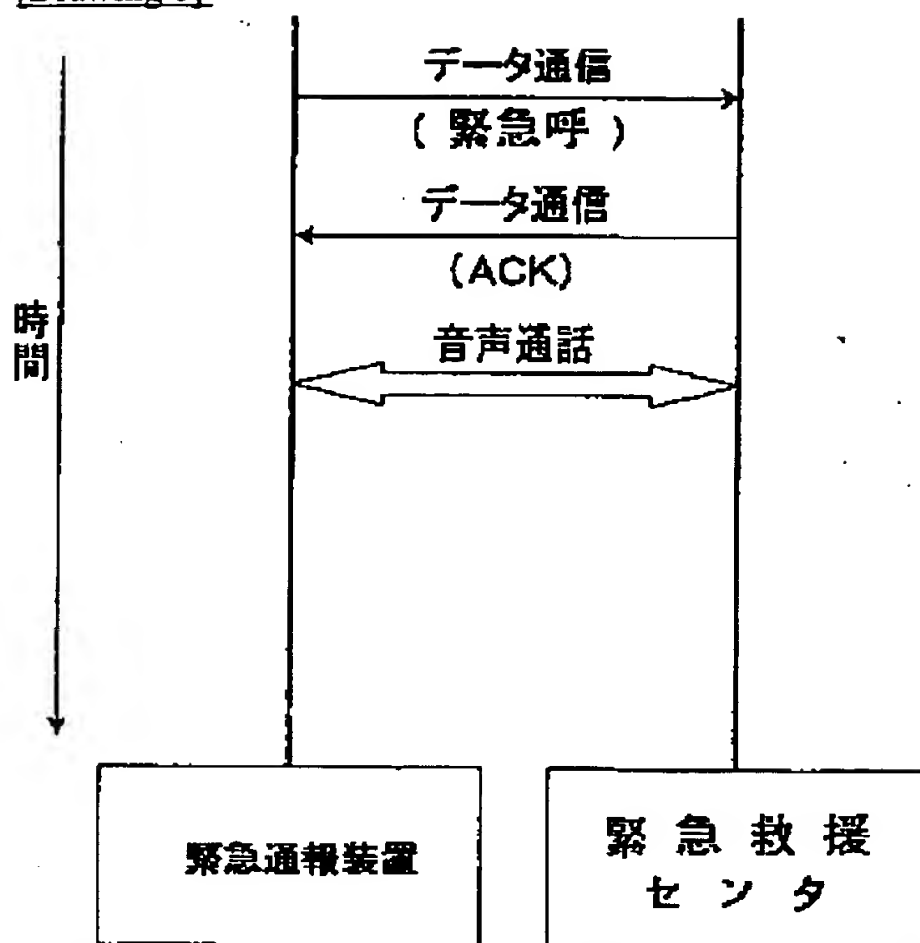
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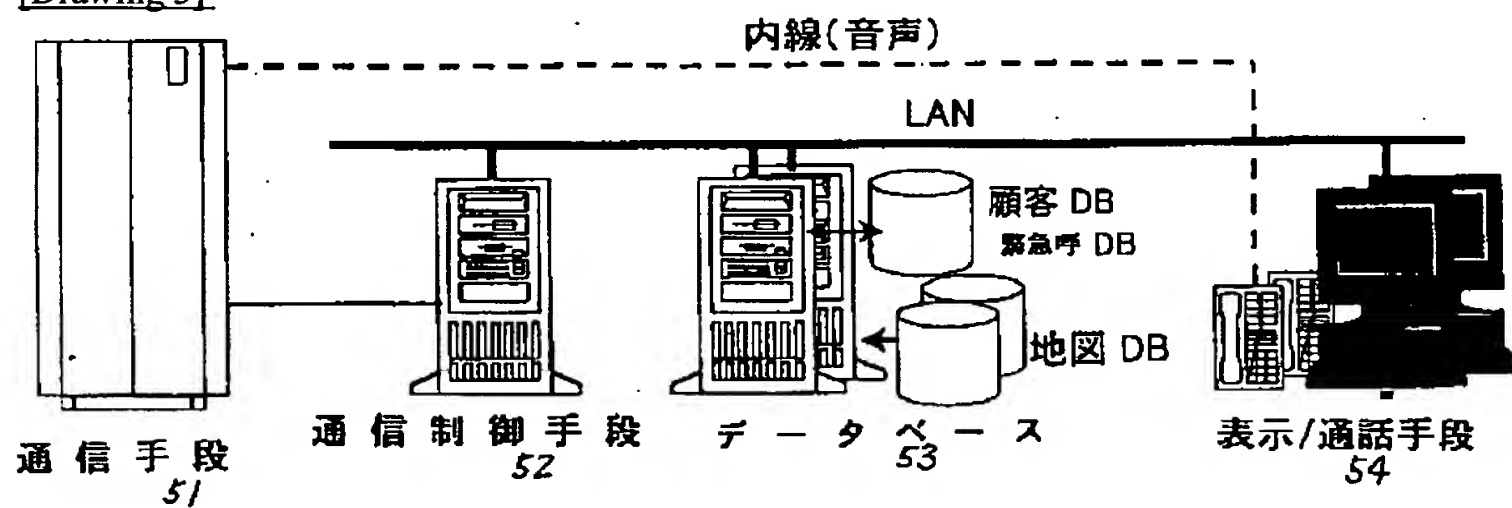
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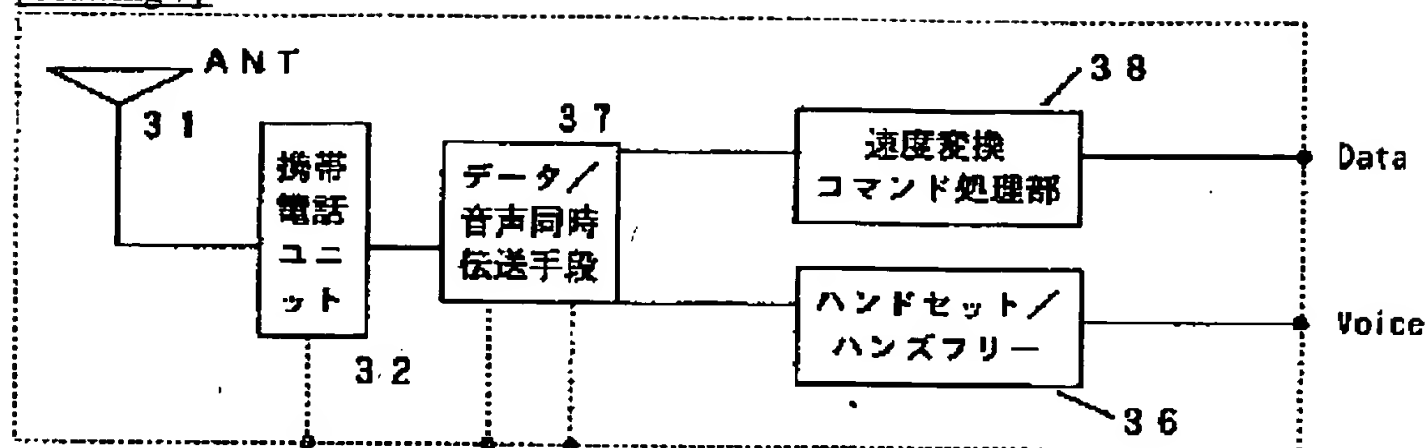
[Drawing 6]



[Drawing 5]

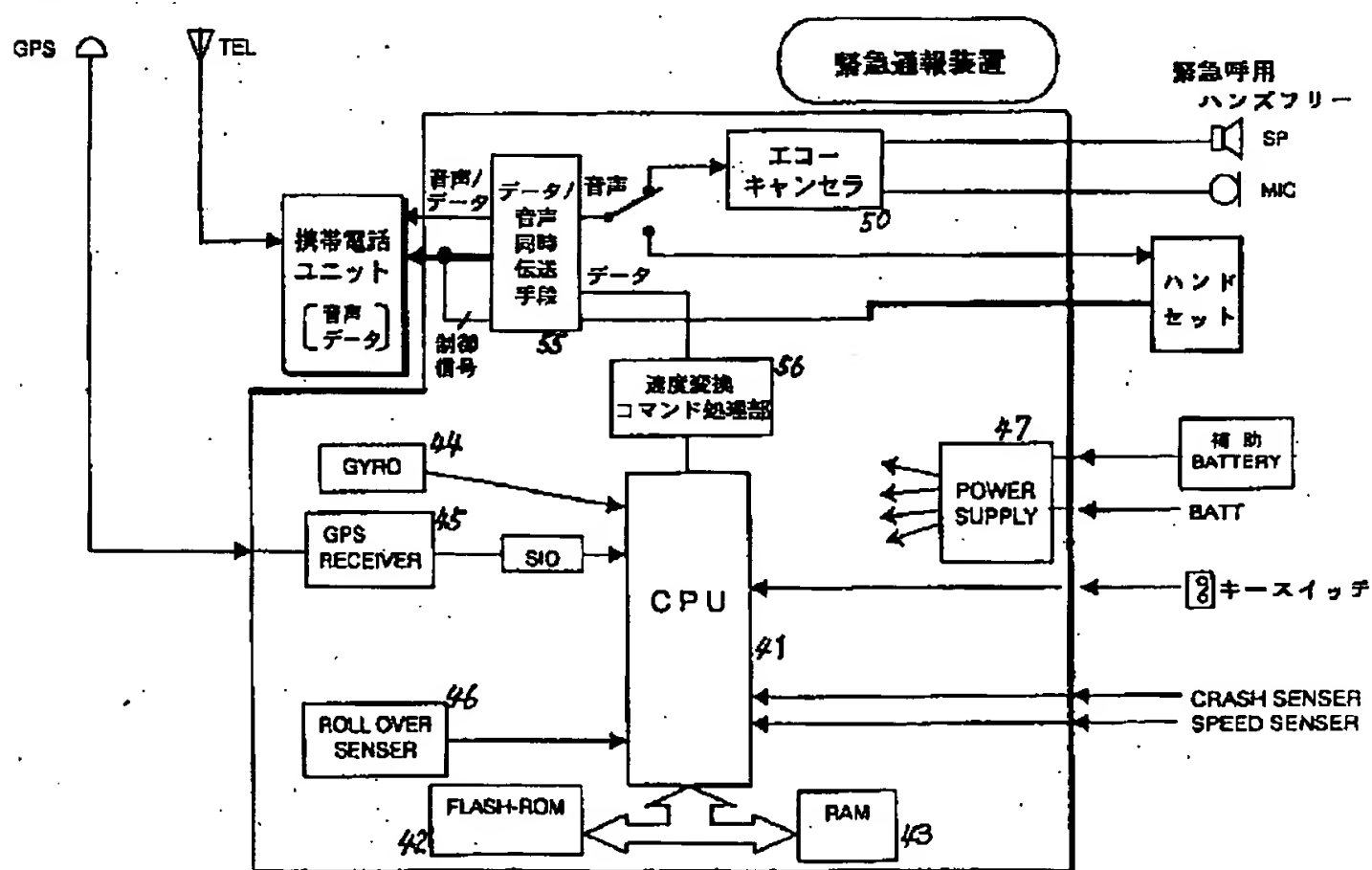


[Drawing 7]



データ/音声同時通信手段

[Drawing 8]





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